Claims

1. A method for producing a copolymer of an alkyl vinyl ether and maleic anhydride using a solution feeding type slurry-polymerization method which comprises the steps of:

(i) feeding an organic solvent which dissolves a copolymer to be produced and maleic anhydride into a reaction vessel, and heating a homogeneous maleic anhydride solution formed;

(ii) feeding an alkyl vinyl ether into the reaction vessel and copolymerizing the alkyl vinyl ether with maleic anhydride in the presence of a free radical initiator to produce a slurry in which the produced copolymer is suspended in a reaction medium; and

(iii) removing the organic solvent used in the reaction under a condition in the range of a temperature capable of maintaining the slurry state.

2. The method according to claim 1 wherein the organic solvent is carboxylic acid ester.

3. The method according to claim 2 wherein the carboxylic acid ester is an acetate.

4. The method according to claim 2 wherein the carboxylic acid ester is ethyl acetate.

5. The method according to claim 1 wherein the organic solvent is ethyl acetate and the weight ratio

of maleic anhydride versus ethyl acetate in the homogeneous maleic anhydride solution is in the range of 1:5 to 1:30.

6. The method according to claim 1 wherein the using weight ratio of maleic anhydride versus alkyl vinyl ether is in the range of 1:1 to 1:3.

7. The method according to any one of claims 1 to 6 wherein the alkyl vinyl ether has 1 to 5 of carbon atoms.

8. The polymerization method according to claim 7 wherein the alkyl vinyl ether is methyl vinyl ether.

9. The method according to any one of claims 1 to 8 wherein the total amount of free radical initiators to be used in the polymerization is in the range of 0.005 to 0.5% by weight based on the maleic anhydride.

10. The method according to any one of claims 1 to 8 wherein the polymerization temperature is in the range of 40 to 120℃.

11. The method according to claim 1 wherein the free radical initiator is at least one selected from the member consisting of a peroxy ester, a diacyl peroxide, a dialkyl peroxide, a hydroperoxy ester and an azonitrile.

12. The method according to claim 6 wherein the using weight ratio of maleic anhydride versus the alkyl vinyl ether is in the range of 1:1.5 to 1:2.5.

13. The method according to claim 9 wherein the total amount of the free radical initiators to be used in the polymerization is in the range of 0.01 to 0.2% by weight based on the maleic anhydride.

14. The method according claim 10 wherein the polymerization temperature is in the range of 50 to 90℃.

15. The method according to any one of claims 1 to 14 wherein, after the slurry is produced, the slurry is once cooled to form a homogeneous solution, and then, heated again to precipitate a copolymer.

16. The method according claim 1 wherein, after completion of polymerization, a bad solvent of the copolymer is added.

17. The method according claim 16 wherein the bad solvent is added while removing the organic solvent, and subsequently, both of the organic solvent and the bad solvent are removed.

18. The method according to any one of claims 1 to 17 wherein the organic solvent is removed while maintaining the copolymer, produced by copolymerizing the alkyl vinyl ether and maleic anhydride in the presence of a free radical initiator, in the temperature range of 50 to 85℃.

19. The method according to any one of claims 1 to 18

wherein the organic solvent is removed while maintaining the copolymer, produced by copolymerizing the alkylvinyl ether and maleic anhydride in the presence of a free radical initiator, in the temperature range of 70 to 85℃.

20. A copolymer of an alkyl vinyl ether and maleic anhydride characterized in that a solvent being capable of dissolving the copolymer, or said solvent and a bad solvent to the copolymer remain in the copolymer in an amount of 0.5% by weight or less.

21. A copolymer of an alkyl vinyl ether and maleic anhydride characterized in that a solvent being capable of dissolving the copolymer, or said solvent and a bad solvent to the copolymer remain in the copolymer in an amount of 0.2% by weight or less.

22. A copolymer of an alkyl vinyl ether and maleic anhydride characterized in that a solvent being capable of dissolving the copolymer, or said solvent and a bad solvent to the copolymer remain in the copolymer in an amount of 0.1% by weight or less.

23. A method for producing a copolymer of an alkylvinyl ether and maleic anhydride which comprises conducting, in a polymerization process, a copolymerization reaction of the alkyl vinyl ether and maleic anhydride, in the presence of a solvent, using a polymerization-initiator to obtain the copolymer,

and after that, conducting a heating treatment of the copolymer obtained, in the posterior processes to the polymerization process, in the substantial absence of oxygen.

24. The method according to claim 23 wherein the heating treatment in the posterior processes to the polymerization process is carried out under an atmosphere of oxygen concentration of 0.5% or lower (converted into normal pressure).

25. The method according to claim 23 or 24 wherein the heating treatment in the posterior processes to the polymerization process is carried out under an inert gas atmosphere.

26. The method according to any one of claims 23 to 25 wherein the heating temperature in the posterior processes to the polymerization process is 60℃ or higher.

27. The method according to any one of claims 23 to 26 wherein the posterior processes to the polymerization process are a solvent removal process and/or a drying process, in addition thereto, a granulation process, a blending process, a transportation process and/or a storage process which are optionally installed.

28. The method according to any one of claims 23 to 27 wherein the alkyl vinyl ether is methyl vinyl

ether.

29. The method according to claim 23 wherein the heating treatment in the posterior processes to the polymerization process is carried out under an atmosphere of oxygen concentration of 0.1% or lower.